

Appl. No. 10/716,894
Atty. Docket No.: 2003B113
Amdt. dated November 1, 2006
Reply to Office Action of August 1, 2006

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REMARKS/ARGUMENTS

Applicants appreciate the courtesies extended by the Examiner to Applicants' representative during an in-person interview on October 10, 2006. The remarks and arguments herein are substantially in accord with the substance of said interview.

Claims 1-6, 9, 12-21, 24, 27-31, 37-40, 58-61, and 67-69, as amended herein, are currently pending for the Examiner's review and consideration. Claims 1, 16, 29, and 58 are amended herein to recite a methanol-to-ethanol ratio from 4.0:1.0 to 9.0:1.0 and a conversion temperature from 475°C to 500°C. These values are in accordance with the ratios and temperatures in Examples II-III (Tables III-IV) of the specification and correspond to the unexpected results alluded to in the interview and mentioned in Applicants' prior Amendment. No new matter has been entered, nor have any new issues been raised, by way of this amendment.

Claim Rejections – 35 USC § 103

Claims 1-40 and 58-81 were rejected under 35 USC § 103(a) as being obvious over U.S. Patent No. 6,441,262 to Fung *et al.*, (hereinafter "Fung"), in view of U.S. Patent No. 4,670,473 to Walker *et al.*, (hereinafter "Walker"), U.S. Patent No. 6,114,279 to Fukui *et al.*, (hereinafter "Fukui"), U.S. Patent No. 4,849,575 to Lewis *et al.*, (hereinafter "Lewis"), and U.S. Patent No. 6,437,208 to Kuechler *et al.*, (hereinafter "Kuechler"). This rejection is traversed, and reconsideration is requested.

Fung discloses using silicoaluminophosphate molecular sieve catalyst to convert a combination of methanol and ethanol to light olefins. The Fung reference is particularly concerned with the problem of how to moderate the olefin product content in an alcohol conversion reaction in which the alcohol feed is predominantly methanol. Fung addresses this problem by using two contact zones. One zone is referred to as an oxygenate conversion zone, which is where a combination of unregenerated and regenerated catalyst contacts methanol for conversion to olefin. The other zone is referred to as an alcohol contact zone, which is where ethanol, propanol, or butanol is contacted with regenerated and fresh catalyst. The use of this dual contacting zone allows for manipulating the olefin content in the product stream.

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This invention is concerned with a more particular problem than that addressed by Fung. More specifically, this invention is concerned with maximizing the amount of light or prime olefin formed (e.g., ethylene and propylene), and at the same time further maximizing the amount of ethylene in the product. This problem is solved by making a particular mix of methanol and ethanol with the aid of a homologation catalyst, and contacting that mix with a silicoaluminophosphate molecular sieve catalyst at an elevated temperature for forming light olefins particularly high in ethylene and propylene content, and particularly in ethylene content.

In order to maximize the overall production of ethylene and propylene, while further maximizing the amount of ethylene produced, Applicants have found that contacting a feed having a mix of methanol and ethanol, at a methanol to ethanol weight ratio of from 4.0:1.0 to 9.0:1.0, with a silicoaluminophosphate molecular sieve catalyst at relatively high temperatures (from 475°C to 500°C), produces a highly desirable product rich in ethylene and propylene, and containing more ethylene than propylene. Applicants' Examples II and III (especially Tables III and IV) show that, under the preferred process conditions, the overall production of ethylene and propylene is increased. At the same time, the amount of ethylene in the product is particularly high.

The ability of forming an olefin product that has a high ethylene and propylene content, with a predominant amount of ethylene, can be achieved by the Fung process. However, Fung does so by using a combination of two different reaction zones and two different feeds. This invention provides a completely different approach than Fung by making a methanol- and ethanol-containing feed in a manner that can be easily controlled and that can be produced in relatively large quantities. Such a process is not suggested by Fung.

Walker is directed to converting syngas to methanol and higher alkanols. The process includes adding the alkanols to a syngas reactor. Lower alkanols are homologated to higher alkanols, and methanol is added as an interstage quench.

Fukui discloses a catalyst that is used for methanol synthesis. The catalyst is made of components that include copper, zinc, and aluminum oxides.

Lewis describes an integrated process for producing olefins. The integrated process uses hydrogen and at least one carbon oxide as feedstock.

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Kuechler discloses a method for making olefin product from an oxygenate-containing feedstock. The oxygenate-containing feedstock is contacted with a silicoaluminophosphate molecular sieve catalyst in a reactor at an average catalyst feedstock exposure index of at least 1.0.

Like Fung, not one of Walker, Fukui, Lewis, or Kuechler suggests contacting a feed having a mix of methanol and ethanol, at a methanol to ethanol weight ratio of from 4.0:1.0 to 9.0:1.0, with a silicoaluminophosphate molecular sieve catalyst at relatively high temperatures (from 475°C to 500°C). As such, there is no suggestion by any combination of the cited references that would provide the benefit of Applicants' invention. That is, no combination of references discloses or suggests a method that would have the benefit of providing a particularly high content of ethylene and propylene, with much of the content weighted toward the ethylene composition. As such, no combination of the cited references discloses or suggests Applicants' claimed invention.

Double Patenting

Claims 1-40 and 58-81 were provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-49 and 71-93 of co-pending Application No. 10/716,685. Claims 1-40 and 58-81 were also provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-74 of co-pending Application No. 10/717,006.

Regarding these double patenting rejections, Applicants respectfully submit that, due to the still-changeable nature of the claims, these rejections should be held in abeyance, e.g., until such point as the claims are allowable but for such double patenting rejections. At that juncture, Applicants will, if necessary, submit the appropriate terminal disclaimer(s) to obviate any then-pending double patenting rejections. Applicants respectfully submit that these rejections are not ripe for resolution until there are otherwise allowable claims in the instant case and allowed or issued claims in the cases to which terminal disclaimers are sought. Indeed, Applicants respectfully note that the M.P.E.P. instructs the Examiner to withdraw a provisional double patenting rejection in the earlier filed of two pending applications and to allow that earlier filed application to issue as a patent without a terminal disclaimer. See M.P.E.P. 804(I)(B)(1).

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CONCLUSION


Having demonstrated that the claims of this application are allowable, this application is in condition for allowance. Accordingly, Applicants request early and favorable reconsideration in the form of a Notice of Allowance.

If there are any questions regarding this or the application in general, a telephone call to the undersigned would be appreciated, since this should expedite the prosecution of the application for all concerned.

If necessary to effect a timely response, this paper should be considered as a petition for an Extension of Time sufficient to effect a timely response. Please charge any deficiency in fees or credit any overpayments to Deposit Account No. 05-1712 (Docket #: 2003B113).

Respectfully submitted,

Date: 11/1/06


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